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Quality Assurance (QA)

"To practice quality control is to develop, design, produce, and service a quality product, which is most economical, most useful, and always satisfactory to the consumer." - K. Ishikawa, 1985

The purpose of Quality Assurance is to provide adequate assurance that the project products and processes conform to their specified requirements and adhere to their established plans throughout the project life cycle.

Quality assurance may be internal or external depending on the degree of organizational freedom and authority required. SID projects typically have three levels of quality assurance:

- Contractor Quality Assurance
- Project Office Quality Assurance
- Independent Validation and Verification (IV&V)

The Contractor QA is internal to the Contractor's development effort and reports to the Contractor's management. The Project Office QA externally monitors the Contractor's development effort and internally monitors the Project Office processes and efforts and reports to the Project Manager. The **IV&V** contractor externally monitors both the Contractor and Project Office efforts and reports to the Project Manager identifies a **QA strategy** to ensure that these levels of QA are complementary.

The overall Quality Assurance plan will be presented in the **Master Project Plan** (MPP). For large projects, the MPP will be supplemented with a separate **QA Plan**.

References:

- IEEE **12207.0-1996**, Standard for Information Technology software life cycle processes (link to pdf)
- IEEE **730-2002** Standard for Software Quality Assurance Plans (link to pdf)
- IEEE **1012-1998** Standard for Software Verification and Validation (link to pdf)
- IEEE **1028-1997** Standard for Software Reviews (link to pdf)
- IEEE **1490-1998** Adoption of PMI's PMBOK, Section 8 Quality Management (link to pdf)

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Quality Assurance Strategies

QA Main

The Quality Assurance strategy defines the project's approach to assuring its products and processes meet specified requirements and adhere to their established plans. Quality assurance may be internal or external depending on the degree of organizational freedom and authority required. SID projects typically have three levels of quality assurance:

- Contractor Quality Assurance
- Project Office Quality Assurance
- Independent Validation and Verification

The **Contractor QA** is internal to the Contractor's development effort and reports to the Contractor's management. The **Project Office QA** externally monitors the Contractor's development effort and internally monitors the Project Office processes and efforts, and reports to the Project Manager. The **IV&V** contractor externally monitors both the Contractor and Project Office efforts and reports to the Project Manager or Sponsor and external agencies like DOF. In the Planning Phase, the Project Office identifies a QA strategy to ensure that these levels of QA are complementary. The objective is to balance the responsibilities between the three QA levels to ensure that quality is adequately evaluated and there is no unnecessary overlap.

TIP The bottom line is that the Project Office is ultimately responsible for Quality Assurance. The Project Office should have a Quality Assurance program that thoroughly evaluates the Contractor's and Project Office work products and processes. The IV&V plan should be structured to oversee the Project Office effort and complement the Project Office oversight of the Contractor in areas of critical need and high risk.

In developing the QA strategy the Project Office must consider:

1. What are the **critical business needs**, high risk areas, and areas of technical difficulty? The Project Manager may want to have all three levels of QA examine these areas. If necessary, the Project Manager may also supplement the QA staff with a subject matter expert to conduct additional studies or analysis. In areas of low risk, the Project Office may leverage the work of the Contractor QA by letting the Contractor QA perform evaluations with the Project Office QA reviewing the Contractor's QA effort.

2. What is the **degree of independence** required? State or federal guidelines may call for a high degree of independence for the verification and validation activities, calling for an emphasis on IV&V. Alternatively, if independence is not essential, a project QA team could perform essentially all of the product evaluations, with a minimal IV&V effort focused on processes.

3. What are the **available skills and domain knowledge** of available QA and IV&V staff? Responsibilities should be assigned to the most qualified group. For instance, a project's staff may have strong business domain knowledge, but limited software development experience. This would call for a Product QA plan focused on business requirements and functional testing, with IV&V concentrating on technical requirements, code reviews, and system performance testing.

4. Consider the **contract flexibility** of Project Office QA versus IV&V. Because of the 'Independence' factor, redirecting the IV&V effort as the project evolves may be difficult. For complex projects, anticipating the problem areas will be difficult, so the project manager may want to rely more heavily on QA resources that can be redeployed more easily. Also, the Project Manager may want to keep greater control/insight of vendor oversight activities by having QA perform most tasks and supplementing with IV&V only for critical areas.

5. What is the **funding available** for QA and IV&V services? Depending on the circumstances, funding may be more readily available for either QA or IV&V, which may influence a project manager's approach.

The Project Office may summarize the QA responsibilities in a **Matrix** (MS Word).